

# Articles

## American Travel Deaths in Mexico Causes and Prevention Strategies

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*Presented in part at the Travel and Tropical Medicine Update IV—1990 conference sponsored by the University of Washington School of Medicine, Seattle, May 1990.*

About 3 to 4 million Americans travel to Mexico every year, yet their mortality experience has never been analyzed. Fatalities among US travelers to Mexico during the years 1975 and 1984 were examined using a previously unanalyzed data source. The leading cause of death to all US travelers to Mexico was injuries (51%), with 18% of deaths resulting from motor vehicle crashes. Of all travelers' deaths, 37% were due to circulatory diseases and less than 1% were due to infectious diseases. While the proportion of all deaths from motor vehicle crashes was similar for US citizens traveling in Mexico and US residents, travelers had significantly higher proportions of injury deaths due to aircraft crashes and drowning. Injury, rather than infectious diseases, appears to pose the greatest risk of death to travelers to Mexico. Physicians and travel clinics need to place greater emphasis on injury prevention when giving advice to clients traveling to Mexico.

(Guptill KS, Hargarten SW, Baker TD: American travel deaths in Mexico—Causes and prevention strategies. *West J Med* 1991 Feb; 154:169-171)

Mexico receives about 3 to 4 million American visitors each year.<sup>1,2</sup> This large population includes business men and women, students, retirees, and others who may face different health risks from their counterparts residing in the United States. Each year there are about 400 deaths of Americans in Mexico, half of whom are travelers, yet mortality for US citizens traveling in Mexico has never been examined. Hargarten and Baker in a study of Peace Corps volunteer deaths were the first to describe the deaths of Americans overseas.<sup>3</sup> The objectives of the present study were to establish the cause-specific mortality pattern of these US citizens and to identify high-risk groups for which health interventions may be targeted.

### Methods and Sources of Data

United States embassy officials are required to report all deaths of US citizens traveling or residing within their jurisdictions. Death reports are sent to the US Department of State, Division of Passports. These documents are used as proof of death by both the government and the next of kin. The documents are not sent to the National Center for Health Statistics or to state vital records officials. According to the director of the Division of Passports, these records have never been analyzed for cause-specific mortality patterns.

The years 1975 and 1984 were selected for analysis. The year 1975 was the earliest year documents were available, and 1984 was the last year for which the documents were complete. Deaths at age 60 years and above outnumbered those at younger than 60 approximately 5 to 1. A 20% systematic sample was taken of the over-60 deaths and a 100%

sample of deaths at younger than 60. The expanded sample was used for all analyses.

Data abstracted from the documents included age, sex, occupation, residing or traveling status, diagnosis, hospital occurrence, and medical certification. Names and original residence in the United States were eliminated to preserve confidentiality. The abstracted data were entered into an IBM 4341 computer and analyzed using the Statistical Package for the Social Sciences (SPSSx). The diagnoses were coded using a condensation of the ninth revision of the *International Classification of Diseases*.<sup>4</sup> Deaths were then grouped into five diagnostic clusters for analysis.

Attempts were made to determine the population of US citizens traveling in Mexico. Insufficient data were available for reliable estimates, so mortality rates for travelers were not calculated. The mortality for US citizens residing in Mexico will be examined separately.

Age- and sex-specific proportional mortality ratios (PMRs) were calculated for US citizens traveling in Mexico. Proportional mortality ratios for US residents were calculated from mortality figures collected by the World Health Organization for 1982.<sup>5</sup> Age- and sex-specific PMRs allowed a direct comparison of the cause-specific distribution of deaths in the two populations. It is important to note that with PMRs, a high proportion of deaths in one category will result in the proportion of another category appearing low regardless of the absolute death rate. In addition, PMRs are influenced by the age and sex distribution of study populations.

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This work was supported in part by Saint Luke's Foundation of Milwaukee, Wisconsin.

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## ABBREVIATIONS USED IN TEXT

CI = confidence interval  
PMR = proportional mortality ratio

## Results

There were 197 deaths of US citizens traveling in Mexico in 1975 and 199 in 1984. The distribution of deaths by age and cause were essentially the same for the two years: therefore, the years were combined for all analyses. Of the reported deaths, 74% occurred in male travelers. Children younger than 15 years accounted for 12% of the deaths, and adults older than 65 years accounted for 18%.

Cause-specific mortality ratios differed between US citizens traveling in Mexico (travelers) and US citizens living in the United States, with deaths due to injury contributing more to the overall deaths of travelers than deaths due to chronic diseases (Figure 1). Travelers had a lower proportion of deaths due to circulatory diseases (37%; 95% confidence interval [CI], 32% to 42%) and malignant neoplasms (4%; 95% CI, 2% to 11%) than did the US population (49% and 22%, respectively). The cause-specific mortality ratio for deaths due to injury (unintentional, homicide, and suicide) was significantly higher for travelers (51%; 95% CI, 46% to 56%) than for US residents (7%).

The elevated proportion of deaths due to injuries for travelers compared with US residents was consistent across age groups for male travelers aged 15 to 54 (Table 1).

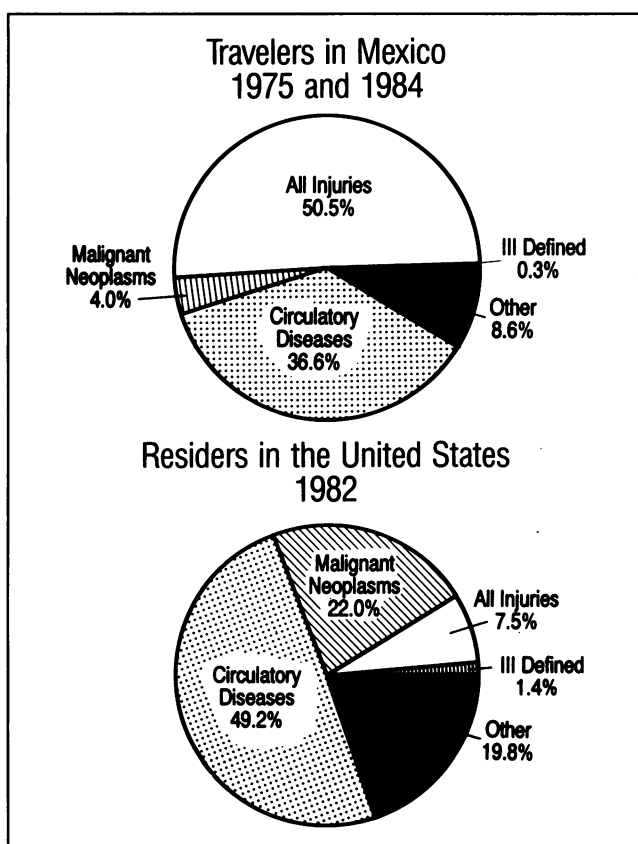


Figure 1.—The proportional mortality ratios are shown for US travelers in Mexico, 1975 and 1984, and for US residents in the United States, 1982 (because of rounding of numbers, the ratios do not add up to 100%). The category "other" includes unspecified medical disorders and infectious diseases.

The types of injury deaths also differed for travelers compared with US residents. Male travelers aged 25 and older did not differ significantly in their proportion of deaths due to motor vehicle crashes compared with their counterparts in the United States (Table 2). Male travelers in this age group, however, had a significantly higher proportion of injury deaths due to aircraft crashes than occurred for US residents. While no differences were seen in the proportion of male deaths due to homicide, suicides made up a significantly smaller proportion of all injury deaths for US travelers when compared with US residents.

Drowning, as a proportion of all male injury deaths, was significantly higher for travelers than for US residents. This difference was found regardless of age. Drowning accounted for 14% (99% CI, 1% to 27%) of injury deaths in the 25 to 34 years age group, 17% (99% CI, 8% to 59%) of the 35 to 55 years age group, and 28% (99% CI, 12% to 43%) of the 45 years and older age group. These proportions compared with PMRs for the same-age US men of 3%, 2%, and 2%, respectively. Although this difference did not reach statistical significance for 25- to 34-year-olds, there was a clear trend.

Age-specific PMRs for male deaths due to circulatory diseases are shown in Table 3. Travelers had lower PMRs

TABLE 1.—Proportion of Male Deaths Due to Unintentional Injuries, Homicide, and Suicide in US Citizens Traveling in Mexico and in US Residents

Age Group, years	US Travelers in Mexico			US Residents in the US		
	No.	%	(95% CI)	No.	%	(95% CI)
15-24	26	92	(82-100)	31,376	80	(80-81)
25-34	50	88	(79-97)	35,362	66	(65-67)
35-44	36	83	(71-96)	37,655	34	(33-35)
45-54	58	50	(37-63)	78,007	13	(12-14)

CI = confidence interval

TABLE 2.—Cause-Specific Distribution of Injury Deaths to Males Aged 25 Years and Older for US Citizens Traveling in Mexico and US Residents

Cause	US Travelers in Mexico n = 127		US Residents in the US n = 78,667	
	%	(95% CI)	%*	(95% CI)
Motor vehicle crash...	24	(20-34)	27	(26-27)
Homicide	12	(6-18)	16	(15-16)
Suicide	4	(3-13)	21	(20-21)
Burns	3	(2-11)	3	(2-3)
Other injuries	26	(18-36)	27	(26-28)
Drowning	20	(13-27)	2	(1-2)
Aircraft crashes	11	(6-16)	4	(3-4)

CI = confidence interval

\*Because of rounding, percentages do not add up to 100%.

TABLE 3.—Proportion of All Male Deaths Due to Circulatory Diseases in US Citizens Traveling in Mexico and US Residents

Age Group, years	US Travelers in Mexico			US Residents in the US		
	No.	%	(95% CI)	No.	%	(95% CI)
35-44	36	14	(3-25)	37,655	27	(26-28)
45-54	58	31	(19-42)	78,007	42	(41-43)
55-64	82	63	(53-73)	179,322	47	(46-48)

CI = confidence interval

than did US residents until the age of 54 years, although the difference only reached statistical significance for 35- to 44-year-olds. At older ages, this pattern reversed. The PMR for 55- to 64-year-old male travelers is 63% compared with 47% for US residents.

There was only one reported death due to an infectious disease (gastroenteritis) during the years examined in this study.

## Discussion

Injuries were the leading cause of death for US citizens traveling in Mexico during 1975 and 1984. Several factors may account for this. First, it is likely that travelers have increased exposure to possible injury. More person-hours may be spent swimming, boating, and traveling when on vacation than when at home. Second, risk-taking behavior may be increased while on vacation. Mixing alcohol consumption with driving or swimming may be more common among vacation travelers than among people who stay at home. Unfortunately, blood alcohol levels, a known risk factor in drowning,<sup>6</sup> were not available from our data source. Third, when an injury does occur, access to adequate emergency medical services may not be as readily available in Mexico as in the US. Unfortunately, the data available will not allow for a determination of the underlying causes of the increased risk.

The PMR for all injuries is particularly high for 15- to 24-year-old males. This high proportion is partially explained by the lower risk of death due to chronic diseases for young people. Males aged 15 to 24, however, should have the same risk of mortality from chronic diseases regardless of traveling status. Thus, the elevated age- and sex-specific PMRs seen for injuries among travelers compared with US residents imply a real, rather than artifactual, increase in risk.

Drowning made up a greater proportion of injury deaths among the travelers than among US residents. The unexpectedly high proportion of injury deaths due to drowning among older travelers (45 years and older) may be a result of the small percentage of deaths due to injuries commonly seen in the US—such as falls. In addition, beaches frequented by travelers are often isolated and unpatrolled, decreasing the chance that those who are drowning will receive prompt and effective rescue and resuscitation. Inexperienced swimmers of all ages should be advised of the greater risks of swimming in unfamiliar waters and the fact that emergency medical services may not be readily available. Travelers should also be advised about the risk of swimming after consuming alcohol.

The PMR for aircraft crashes was significantly elevated for male travelers aged 25 years and older. Unscheduled aircraft flights are a known risk factor for aircraft deaths,<sup>7</sup> but our data source did not specify the types of aircraft crashes. Nonetheless, travelers should avoid unscheduled airplane flights.

Though motor vehicle crashes contributed similarly to injury deaths of US travelers and US residents, Mexico may have special risks and injury patterns. Further study is needed to determine contributions from host, vehicle, and environment, such as alcohol usage, seat belt availability and usage, and the availability of emergency medical services.

United States travelers to Mexico should, whenever possible, use well-maintained, larger cars with seat belts and experienced drivers. Evening driving should be discouraged. Helmets should be worn when riding motorcycles and bicycles.

Deaths due to circulatory diseases and malignant neoplasms occurred in a lower proportion among travelers than among US residents. This may be because healthy, not chronically ill, people travel.

Our study is limited by not including the deaths of travelers to Mexico who return to the United States and die. Further studies are needed to describe this mortality and the morbidity of travelers who return seriously ill or injured. Also, age-specific death rates were not calculated. Additional study is necessary to determine age-specific death rates and describe risk factors for mortality. Better methods of recording the number of travelers to Mexico are necessary before age-specific mortality rates can be determined.

## Conclusions

Most American physicians think that their patients who travel to Mexico are at an increased risk from infectious diseases. While this is certainly true for morbidity,<sup>2,8-10</sup> we found that infectious diseases did not significantly contribute to travelers' in-country mortality. The major contributor to deaths for all ages was injury. Travelers' clinics and family physicians should instruct travelers on the risks of motor vehicle and unscheduled aircraft travel and swimming in unfamiliar waters, in addition to the precautions for infectious diseases.

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